

3430
BIOLOGICAL
EVALUATION R4-80-2

Larch Casebearer
Payette and Boise National Forests

March 1980

PREPARED BY: Arland C. Valcarce
Arland C. Valcarce
Entomologist

APPROVED BY:

Max M. Ollieu
Max M. Ollieu
Director
Forest Insect and Disease Management

Forest Insect and Disease Management
State and Private Forestry
Intermountain Region
USDA-Forest Service
324 - 25th Street
Ogden, Utah 84401

BIOLOGICAL EVALUATION
LARCH CASEBEARER
PAYETTE AND BOISE NATIONAL FORESTS*

1979

INTRODUCTION

Larch casebearer, Coleophora laricella (Hbn.) was first discovered in Forest Service Region 4 near Cascade, Idaho in 1977. A follow-up survey showed all larch stands in the Region to be infested. Casebearer apparently now occurs throughout the natural range of western larch, Larix occidentalis Nutt.

Only native species of parasites were reared from casebearer samples during the initial survey. However, a special effort in 1978 introduced the European braconid parasite, Agathis pumila (Ratz.) into Region 4 larch stands.

A field evaluation was conducted in 1979 to determine casebearer infestation trend in Region 4 covering the Payette and Boise National Forests. Results of the survey in this report updates casebearer infestation status and assesses establishment of Agathis and (coincidentally) the eulophid, Chrysocharis laricinellae (Ratz.), one year after release.

GENERAL INFORMATION

Insect: Larch casebearer, Coleophora laricella (Hubner).

Host Tree: Western larch, Larix occidentalis Nutt.

Location: Throughout western larch stands on the Payette and Boise National Forests, other federal, state and private forested lands.

Type of Damage: Defoliation with potential for increased intensity at elevations below 4,500 feet; also increment loss and increased susceptibility to other tree mortality agents.

Extent of Infestation: Throughout the natural range of western larch south of the Salmon River in Idaho.

SURVEY METHODS

The survey was conducted June 18-22, 1979, using the linear measurement technique of Theroux and Long, 1978. Ten trees at each of twelve locations, representative of western larch stands on the Payette and Boise National

*Prepared by Arland C. Valcarce, Entomologist, USDA, Forest Service, State and Private Forestry, Boise, Idaho.

Forests, were sampled for casebearer populations, Figure 1. Dominant or codominant trees 30 to 50 feet tall were selected. Four branches, one from each quadrant, are usually cut from mid-crown on each tree, but during the 1979 survey only two branches were cut from opposite sides of mid-crown. Casebearer pupae were counted on a terminal length of approximately 36 linear inches containing 100 needle fascicles per branch. Extra pupae, as well as pupae from sample twigs, were reared in petri dishes.

BIOLOGICAL INFORMATION

A brief description of the life cycle and damage taken from Denton and Tunnock (1971) follows: Larch casebearer overwinters as a third instar larva, inside a case made from a hollow needle. In the spring they become active and begin feeding by mining new needles. During late May and early June pupation takes place. New adults emerge in July. Eggs, which number about 50 per female, are laid singly on the needles. Eggs hatch and larvae mine into needles from points of egg attachment. Feeding continues for about two months until frost during which time the larvae form mobile cases from larch needles. In the fall, when larch defoliates, casebearer larvae congregate on twigs to overwinter. Feeding begins when the weather warms again in April. Severe defoliation for four or more years can kill trees. Trees weakened by larch casebearer become susceptible to other damaging agents.

RESULTS AND DISCUSSION

Pupal populations in 1979 averaged 9.6 larch casebearer per 100 needle fascicles and ranged from 0.1 to 67.5 casebearer at elevations below 6,000 feet (Table 1). In contrast, populations averaged 2.97 with a range of .03 to 12 casebearer per 100 fascicles in 1977, which indicates a slightly increasing trend over the past two years.

The method of forecasting defoliation trends reported by Ciesla and Bousfield (1974), was used to array expected late summer defoliation using the pupal stage (Table 2).

Species of hymenopterous parasites that were reared from casebearer pupae are shown in Table 3. Agathis pumila was recovered from the Lost Valley plot; Chrysocharis laricinellae was recovered from Little Goose Creek and Lower Goose Creek plots, one year after release, indicating these two parasites have been established in those areas. Chrysocharis was a fringe benefit from the releases of Agathis in 1978. It is probable that Agathis will be recovered from most of the release sites when given

sufficient time for populations to increase. Hopefully, high rates of casebearer parasitism will occur over the next several years from these parasites. Further propagation of Agathis and Chrysocharis can then be readily accomplished from local areas.

RECOMMENDATIONS

1. FI&DM conduct a population and damage survey in 1980 for trend purposes.
2. FI&DM continue with approved plans to further establish Chrysocharis into parasite free casebearer populations as has been agreed to by land managers.

Table 1. Larch Casebearer Survey summary, Payette and Boise National Forests, Idaho 1979.

<u>Location</u>	<u>Elevation</u> (feet)	<u>LCB pupae/100</u> <u>fascicles</u>	<u>Percent</u> <u>parasitism</u>
Lower Goose Creek	3,900	16.5	4.
Upper Goose Creek	4,000	.1	0
Lower Boulder Creek	4,000	5.3	8.
Lost Valley	4,104	11.9	19.
Little Goose Creek	4,200	67.5	7.
Smith's Ferry	4,536	5.7	11.
Fall Creek	4,900	.7	0
Cascade	5,209	1.5	3.
Fourth of July Creek	5,300	4.6	2.
Upper Boulder Creek	5,800	.5	9.
Railroad Saddle	6,000	0	0
Freight Landing	<u>6,451</u>	<u>0</u>	<u>0</u>
MEAN	4,867	9.6*	8.**

$$\frac{\text{* 2,292 pupae}}{24,000 \text{ fascicles}} = 9.6 \text{ pupae/100 fascicles}$$

$$\frac{\text{** 195 parasites}}{2,477 \text{ pupae}} \times 100 = 8 \text{ percent parasitism}$$

Table 2. Larch Casebearer Populations
1977-79, Boise and Payette National Forests

		LCB pupae/100 fascicles		Defoliation forecast	
		1977	1979	1977	1979
(1)	Lower Goose Creek	12.13	16.5	Light	Light
(2)	Upper Goose Creek	(Not sampled)	.1	-	Negligible
(3)	Lower Boulder Creek	6.65	5.3	Negligible	Negligible
(4)	Lost Valley	2.65	11.9	Negligible	Light
(5)	Little Goose Creek	(Not sampled)	67.5	-	Moderate
(6)	Smith's Ferry	2.03	5.7	Negligible	Negligible
(7)	Fall Creek	2.98	.7	Negligible	Negligible
(8)	Cascade	1.30	1.5	Negligible	Negligible
(9)	Fourth of July Creek	1.33	4.6	Negligible	Negligible
(10)	Upper Boulder Creek	.23	.5	Negligible	Negligible
(11)	Railroad Saddle	(Not sampled)	0	-	0
(12)	Freight Landing	.03	0	Negligible	0
MEANS		2.97	9.6		

Table 3. Wasp Parasites*Reared from LCB

	<u>Number reared</u>	<u>Location</u>
<u>Spilochalcis albifrons</u>	101 44 16 12 8 1 1	Little Goose Creek Lost Valley Smith's Ferry Lower Goose Creek Lower Boulder Creek Upper Boulder Creek Fourth of July Creek
<u>Agathis pumila</u>	4	Lost Valley
<u>Chrysocharis laricinellae</u>	1 1	Little Goose Creek Lower Goose Creek
<u>Bracon</u> sp.	1 1 1 1 1	Cascade Fourth of July Creek Lower Goose Creek Little Goose Creek Lower Boulder Creek
<u>Tetrastichus</u> sp.	1	Little Goose Creek

*Identifications mainly by Roger B. Ryan, Princ. Entomologist, PNW, Forestry Sciences Laboratory, Corvallis, Oregon

REFERENCES

Bousfield, W.E. and R.C. Lood
1973. Parasites of the larch casebearer in Montana, Idaho, and Washington. *Environmental Entomology* 2(2): 212-213.

Ciesla, W.M. and W.E. Bousfield
1974. Forecasting potential defoliation by larch casebearer in the northern Rocky Mountains. *J. Econ. Entomol.* 67(1): 47-51.

Denton, Robert E. and Scott Tunnock
1971. Larch casebearer in western larch forests. *USDA, Forest Service, For. Pest Leaflet*. 96, 8 p. (Rev.). Washington, D.C.

Ryan, R.B., W.E. Bousfield, C.W. Johanningmeier, G.B. Parsons, R.F. Schmitz, and L.J. Theroux
1977. Releases of recently imported larch casebearer parasites for biological control in the western United States, including relocations of Agathis pumila. *USDA-Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. PNW-290*, 8 p.

Ryan, R.B., W.E. Bousfield, R.E. Denton, R.L. Johnsey, L.F. Pettinger, and R.F. Schmitz
1975. Additional releases of larch casebearer parasites for biological control in the western United States. *USDA-Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. PNW-242*. 7 p.

Theroux, L.J. and G.E. Long
1978. Linear measurement: A method of estimating fascicle numbers for larch casebearer population sampling. *USDA-Forest Service Res. Note, INT-245*, 8 p. *Int. For. and Range Exp. Stn., Ogden, Utah.*

Tunnock, Scott, Mark McGregor, and Wayne Bousfield
1972. Distribution of larch casebearer parasites in the crowns of western larch trees in the Northern Region. *USDA-Forest Service, Division of State and Private Forestry, Northern Region, Missoula, Montana.* 7 p.

Valcarce, A.C.
1978. Biological evaluation, larch casebearer, Payette and Boise National Forests, 1977. *USDA-Forest Service, State and Private Forestry Rep. R-4 78-8*, 5 p. *Ogden, Utah.*

Valcarce, A.C.
1979. Biological control - larch casebearer - 1978 release of Agathis pumila in R-4. *USDA-Forest Service, State and Private Forestry Rep., 4 p.*, Ogden, Utah.

